

ABSTRACT

A double blanket ion implant method for forming diffusion regions in memory array devices, such as a MOSFET access device is disclosed. The method provides a semiconductor substrate with a gate structure formed on its surface. Next, a first pair of diffusion regions are formed in a region adjacent to the channel region by a first blanket ion implantation process. The first blanket ion implantation process has a first energy level and dose. The device is subjected to oxidizing conditions, which form oxidized sidewalls on the gate structure. A second blanket ion implantation process is conducted at the same location as the first ion implantation process adding additional dopant to the diffusion regions. The second blanket ion implantation process has a second energy level and dose. The resultant diffusion regions provide the device with improved static refresh performance over prior art devices. In addition, the first and second energy levels and doses are substantially lower than an energy level and dose used in a prior art single implantation process.